



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,799	11/12/2003	Joel S. Karp	UPN-4296	7178

23377 7590 07/11/2006

WOODCOCK WASHBURN LLP
ONE LIBERTY PLACE, 46TH FLOOR
1650 MARKET STREET
PHILADELPHIA, PA 19103

EXAMINER

SUNG, CHRISTINE

ART UNIT PAPER NUMBER

2884

DATE MAILED: 07/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/706,799

Applicant(s)

KARP ET AL

Examiner

Christine Sung

Art Unit

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

1. The amendment filed on April 19, 2006 has been accepted and entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-3,6-9 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a PET scanner with the particular LaBr_3 or LaCl_3 scintillator, does not reasonably provide enablement for *all* scintillators that have a decay time constant of less than 35 ns and a light output at least equal to that of NaI(Tl) . The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. Applicant's specification discloses LaBr_3 or LaCl_3 type scintillators, but does not encompass *all* scintillators known or unknown with the claimed properties.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

Art Unit: 2884

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Loef (*High -Energy Resolution Scintillator: Ce+3 Activated LaBr₃*) in view of Cho (US Patent 4,980,552 A).

Regarding claims 1-2, Van Loef discloses a detector (column 2, paragraphs 1-2) comprising:

A scintillator comprising a crystal (column 2, paragraph 1), the scintillator having a decay time constant $\tau \leq 35$ ns (see table 1, data for LaBr₃ or LaCl₃) and a light output at least equal to the light output of NaI (Tl) (see table 1, data for LaBr₃ or LaCl₃) and

A photomultiplier (column 2, paragraph 2). Van Loef further teaches that the scintillator has applications in medical imaging, gamma ray spectroscopy, etc. (column 1, paragraph 1). Further Van Loef discloses that this scintillator is ideal for medical imaging and gamma ray spectroscopy because of its high light output and very fast decay time (column 1, paragraph 4).

Van Loef does not disclose using a plurality of the detector devices and further does not disclose the conventional PET detector positioning, where the plurality of crystals and PMTs are placed around the periphery of the cavity where a patient is accepted. However, Cho discloses the conventional PET detector (figure 3) where a plurality of scintillator crystals (element DET 1-23) and a plurality of PMTs (element PMT #1-23) are arranged respectively around a cavity for accepting a patient (element 302). One of ordinary skill in the art would be motivated to take

Art Unit: 2884

the medical imaging/ gamma spectroscopy detector disclosed by Van Loef and place them in the conventional PET configuration as disclosed by Cho in order to increase detection efficiency and scatter rejection as well as provide effective time of flight image data filtering (see Cho abstract). Cho further teaches that such a configuration increases image resolution and reduces the system costs.

Regarding claim 3, Van Loef discloses a detector (column 2, paragraphs 1-2) comprising:

A scintillator comprising a crystal (column 2, paragraph 1), the scintillator having a decay time constant $\tau \leq 35$ ns (see table 1, data for LaBr₃ or LaCl₃) and a light output at least equal to the light output of NaI (Tl) (see table 1, data for LaBr₃ or LaCl₃) and

A photomultiplier (column 2, paragraph 2). Van Loef further teaches that the scintillator has applications in medical imaging, gamma ray spectroscopy, etc. (column 1, paragraph 1). Further Van Loef discloses that this scintillator is ideal for medical imaging and gamma ray spectroscopy because of its high light output and very fast decay time (column 1, paragraph 4).

Van Loef does not disclose using a plurality of the detector devices, the conventional PET detector positioning, where the plurality of crystals and PMTs are placed around the periphery of the cavity where a patient is accepted and does not disclose the conventional coincidence processor/circuitry. However, Cho discloses the conventional PET detector (figure 3) where a plurality of scintillator crystals (element DET 1-23) and a plurality of PMTs (element PMT #1-23) are arranged respectively around a cavity for accepting a patient (element 302). Further, Cho discloses a conventional time circuit that records the time of receipt of gamma rays by the PET detectors and provides timing data outputs (column 10, lines 52-62) as well as a processor that receives the timing data outputs and calculates the TOF of gamma rays in the

Art Unit: 2884

reconstruction of images of the patient (column 10, lines 57-62). One of ordinary skill in the art would be motivated to take the medical imaging/ gamma spectroscopy detector disclosed by Van Loef and place them in the conventional PET configuration as disclosed by Cho in order to increase detection efficiency and scatter rejection as well as provide effective time of flight image data filtering (see Cho abstract). Cho further teaches that such a configuration increases image resolution and reduces the system costs.

Regarding claims 4-5, Van Loef discloses that the scintillator comprises LaBr_3 or LaCl_3 (Table 1).

Regarding claims 6-7, Van Loef discloses that the scintillator crystal has dimensions of $3 \times 10 \text{ mm}^3$ (Column 2, paragraph 1), and states that the crystal was cut from a larger crystal. Although Van Loef and Cho do not disclose the exact dimensions, one of ordinary skill in the art would be motivated to cut the crystals from the stock crystal as claimed in order to increase the stopping power (i.e. increase the scintillator thickness) or increase the spatial resolution by decreasing the individual crystal size, but increasing the number of crystals.

Regarding claim 9, Cho discloses that the detector modules are arranged in a cylindrical configuration about the cavity (see figure 3).

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Loef (*High - Energy Resolution Scintillator: Ce+3 Activated LaBr₃*) in view of Cho (US Patent 4,980,552 A) further in view of Cherry (US Patent 6,552,348 B2).

Regarding claim 8, Van Loef in view of Cho discloses the limitations set forth in claim 1, but does not specify the use of a light guide between the PMT and the scintillator crystals for optical coupling. However, such a configuration is known in PET/gamma detector systems as

disclosed by Cherry (figure 1B, element 12 = light guide). One of ordinary skill in the art would be motivated use a light guide between the PMT and the scintillator in a PET detector in order to increase detection efficiency and spatial resolutions (see abstract).

Response to Arguments

8. Applicant's arguments filed on April 19, 2006 have been fully considered but they are not persuasive.
9. Applicant's arguments with respect to claims 1-3 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Shah US Pre Grant Publication 2005/0104001 A1- this reference was previously cite and claims very similar subject matter.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 2884

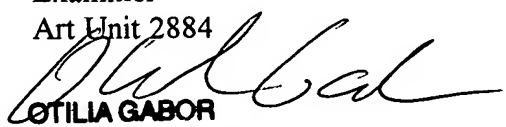
CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 7-3 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CS

Christine Sung
Examiner
Art Unit 2884

OTILIA GABOR
PRIMARY EXAMINER